

CLAIMS

What is claimed is:

1. A method comprising:
 - receiving information regarding an atomic distributed transaction, the atomic distributed transaction representing an aggregation of a plurality of discrete transactions for resource items that span a plurality of network resources;
 - placing a tentative hold on each of the plurality of resource items by causing a tentative hold record to be created and associated with each of the plurality of discrete transactions, the tentative holds operating in a non-mutually exclusive manner, thereby allowing the same resource item to be tentatively held by more than one transaction; and
 - after successfully gaining the tentative holds on each of the plurality of resource items and receiving a confirmation regarding the atomic distributed transaction, attempting to direct the completion of the atomic distributed transaction by conventional means.
2. The method of claim 1, wherein said attempting to direct the completion of the atomic distributed transaction by conventional means comprises initiating conventional Two-Phase Commit (2PC) prepare and commit processing for each of the plurality of discrete transactions.
3. The method of claim 1, further comprising receiving a notification indicating one of the plurality of discrete transactions are no longer possible.
4. The method of claim 1, wherein one or more of the tentative hold records are stored at an intermediate server that is not within the enterprise offering the resource item.

1 5. The method of claim 1, wherein the plurality of network resources comprise
2 database systems of a plurality of different enterprises.

1 6. A method comprising:
2 receiving information regarding a distributed transaction from an originating
3 application, the distributed transaction involving a plurality of items
4 spanning a plurality of network resources; and
5 initiating a tentative-hold processing stage by requesting that a plurality of
6 resource managers residing on one or more remote servers and
7 participating in the distributed transaction each tentatively hold an item of
8 the plurality of items involved in the distributed transaction and store call
9 back information identifying a return communication path to the
10 originating application, the tentative hold records operating in a non-
11 mutually exclusive manner, thereby allowing items associated with the one
12 or more remote servers to be tentatively held by more than one application.

1 7. The method of claim 6, wherein at least two of the remote servers are associated
2 with different enterprises.

1 8. The method of claim 6, further comprising receiving a commitment corresponding
2 to the distributed transaction from the originating application; and responsive to
3 the commitment, initiating a two-phase commit processing stage by directing the
4 resource managers to reserve the items during which the resource managers
5 reserve the items and notifying, via corresponding call back information, other
6 applications having a tentative hold on the same items that their respective
7 tentative holds have been suspended.

1 9. A method comprising:
2 receiving, from a first client, a first request associated with a first discrete
3 transaction, the first request soliciting a non-mutually exclusive hold on a
4 resource item; the resource item being part of a first atomic distributed
5 transaction that spans a plurality of network resources;
6 maintaining a first non-mutually exclusive hold on the resource item until an
7 exclusive lock is obtained on the resource item or for a predetermined
8 amount of time, whichever occurs first, by causing a first tentative hold
9 record to be created and associated with the resource item and initiating a
10 first timeout associated with the first tentative hold record;
11 receiving, from a second client, a second request associated with a second discrete
12 transaction, the second request soliciting a non-mutually exclusive hold on
13 the resource item, the resource item being part of a second atomic
14 distributed transaction;
15 maintaining a second non-mutually exclusive hold on the resource item until an
16 exclusive lock is obtained on the resource item or for a predetermined
17 amount of time, whichever occurs first, by causing a second tentative hold
18 record to be created and associated with the resource item and initiating a
19 second timeout associated with the second tentative hold record;
20 receiving, from the first client, a third request associated with the first discrete
21 transaction, the third request asking that completion of the first discrete
22 transaction commence; and

responsive to the third request, suspending the second non-mutually exclusive hold and granting an exclusive lock on the resource item to the first discrete transaction.

10. The method of claim 9, wherein at least two network resources of the plurality of network resources are associated with different enterprises.

11. The method of claim 9, further comprising:
storing call back information associated with an application originating the second discrete transaction; and
notifying the application regarding the suspension of the second non-mutually exclusive hold.

12. The method of claim 9, further comprising in response to a timeout on the exclusive lock, recommencing the second non-mutually exclusive hold on behalf of the second discrete transaction.

13. A distributed transaction processing system comprising:
a distributed transaction coordinator executing on a first client system, the distributed transaction coordinator to place non-mutually exclusive holds on each of a plurality of resource items associated with an atomic distributed transaction that spans a plurality of network resources and to commence completion of the atomic distributed transaction by obtaining exclusive locks on each of the plurality of resource items after non-mutually exclusive holds have been successfully granted on each of the plurality of resource items; and

10 a distributed transaction manager executing on a server system communicatively
11 coupled with a plurality of client systems including the first client system,
12 the distributed transaction manager to maintain a plurality of non-mutually
13 exclusive holds for each of a plurality of resource items associated with
14 the server system and to grant only one exclusive lock per single resource
15 item of the plurality of resource items at a given time in response to
16 requests from distributed transaction coordinators.

1 14. The distributed transaction processing system of claim 13, wherein the distributed
2 transaction coordinator includes a Two-Phase Commit transaction coordinator.

1 15. The distributed transaction processing system of claim 13, further comprising one
2 or more Two-Phase Commit resource managers communicatively coupled with
3 the distributed transaction manager.

1 16. A machine-readable medium having stored thereon data representing sequences of
2 instructions, the sequences of instructions which, when executed by a processor,
3 cause the processor to:

4 receive information regarding an atomic distributed transaction, the atomic

5 distributed transaction representing an aggregation of a plurality of

6 discrete transactions for individual resource items that span a plurality of
7 network resources;

8 place a tentative hold on each of the plurality of individual resource items by

9 causing a tentative hold record to be created and associated with each of

10 the plurality of discrete transactions, the tentative holds operating in a non-

11 mutually exclusive manner, thereby allowing the same resource item to be
12 tentatively held by more than one interested party; and
13 after successfully gaining the tentative holds on each of the plurality of individual
14 resource items and receiving a confirmation regarding the atomic
15 distributed transaction, attempt to direct the completion of the atomic
16 distributed transaction by conventional means.

1 17. The machine-readable medium of claim 16, wherein said attempt to direct the
2 completion of the atomic distributed transaction by conventional means comprises
3 initiating conventional Two-Phase Commit (2PC) prepare and commit processing
4 for each of the plurality of discrete transactions.

1 18. The machine-readable medium of claim 16, wherein one or more of the tentative
2 hold records are stored at an intermediate server that is not within the enterprise
3 offering the resource item.

1 19. The machine-readable medium of claim 16, wherein the plurality of network
2 resources comprise database systems of a plurality of different enterprises.

1 20. A machine-readable medium having stored thereon data representing sequences of
2 instructions, the sequences of instructions which, when executed by a processor,
3 cause the processor to:
4 receive, from a first client, a first request associated with a first discrete
5 transaction, the first request soliciting a non-mutually exclusive hold on a
6 resource item; the resource item being part of a first atomic distributed
7 transaction that spans a plurality of network resources;

8 maintain a first non-mutually exclusive hold on the resource item until an
9 exclusive lock is obtained on the resource item or for a predetermined
10 amount of time, whichever occurs first, by causing a first tentative hold
11 record to be created and associated with the resource item and initiating a
12 first timeout associated with the first tentative hold record;
13 receive, from a second client, a second request associated with a second discrete
14 transaction, the second request soliciting a non-mutually exclusive hold on
15 the resource item, the resource item being part of a second atomic
16 distributed transaction;
17 maintain a second non-mutually exclusive hold on the resource item until an
18 exclusive lock is obtained on the resource item or for a predetermined
19 amount of time, whichever occurs first, by causing a second tentative hold
20 record to be created and associated with the resource item and initiating a
21 second timeout associated with the second tentative hold record;
22 receive, from the first client, a third request associated with the first discrete
23 transaction, the third request asking that completion of the first discrete
24 transaction commence; and
25 responsive to the third request, suspend the second non-mutually exclusive hold
26 and grant an exclusive lock on the resource item to the first discrete
27 transaction.

- 1 21. The machine-readable medium of claim 20, wherein at least two network
2 resources of the plurality of network resources are associated with different
3 enterprises.

1 22. The machine-readable medium of claim 20, wherein the sequences of instructions
2 further include instructions which, when executed by the processor, cause the
3 processor to:
4 store call back information associated with an application originating the second
5 discrete transaction; and
6 notify the application regarding the suspension of the second non-mutually
7 exclusive hold.

1 23. The method of claim 20, wherein the sequences of instructions further include
2 instructions which, when executed by the processor, cause the processor to
3 recommence the second non-mutually exclusive hold on behalf of the second
4 discrete transaction in response to a timeout on the exclusive lock.